Document: Draft, Phase 1 Evaporation Ponds Characterization Data Summary Report Update, Anaconda Copper Mine Site – Yerington, Nevada, August 18, 2017

Reviewer: Yerington Paiute Tribe

Specific Comments

#	Section Page	Comment
1	2.4 5	Geotechnical Tests - Sample quantities were reduced due to groundwater encountered above the maximum planned depth of 70 feet Page 5; Section 2.4 - Vadose Zone - A more detailed explanation of the field conditions resulting in the decrease in sample numbers should be included here or elsewhere. Who justified it? Was it approved? Were other sampling locations considered to meet sample size? Please justify.
2	3.1 6	Justification here for variability of depth of contaminant is confusing. "This variability with depth bgs is interpreted as resulting from high concentrations at depth due to larger quantities of material between the ground surface and pond sediment and calcine residues in the Calcine Ditch causing pond sediment/calcine residues to be buried at greater depths; and historical mobilization and downward transport of constituents associated with past mining process water management..."
3	3.1 7	(footnote) EP-VZC-6 has depths much greater than the other vadose zone samples. Justify why this is not an anomaly. Although of interest for discussion of liability, the discussion of comparing sample concentrations with background concentrations is premature (additional comments below). It would be more appropriate to discuss results within the framework of the results and laboratory data. How many ND? Was any data flagged by the laboratory? Where their issues with blanks, etc.? How was quality control on samples and analytes?
4	3.1 6	To add to comment 2 regarding the vague wording, the elevated values in the Calcine Ditch at depth: *"Although the highest analyte concentrations are typically found in the 0-1.5 ft bgs interval and concentrations attenuate with depth, there is variability, as indicated by calculated standard deviations (Table 3-1) and the ranges in maximum and minimum values (Table 3-1 and Figure 3-12), in concentrations at the 1.5-10 ft bgs and >10 ft bgs intervals. This variability with depth bgs is interpreted as resulting from high concentrations at depth due to larger quantities of material between the ground surface and pond sediment and calcine residues in the Calcine Ditch causing pond sediment/calcine residues to be buried at greater depths; and historical mobilization and downward transport of constituents associated with past mining process water management (e.g. as discussed in Section 3.3)."*

Document: Draft, Phase 1 Evaporation Ponds Characterization Data Summary Report Update, Anaconda Copper Mine Site – Yerington, Nevada, August 18, 2017

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Specific Comments (continued)

4	3.1 6 (cont.)	Creates questions regarding the sampling location selection and interpretation of the data. If the elevated concentrations are due to the transport of "pond sediments/calcine residues to be buried at greater depths" would this not have been identified in the borings, that the samples were above natural ground surface? If the material is below natural ground surface, are these concentrations due to downward migration meeting a change in soil type resulting in accumulation?
5	3.2 13	The groundwater monitoring data used to compare (BC 2016c) is the 2015 annual report and may differ from the 2016 sampling because of meteoric differences in the region (dry Walker River vs flooding Walker River). These data should be compared to the 2016 annual groundwater monitoring report (yet available?). Based on sample location and concentrations, how homogeneous do we expect the calcine residues to be?

General Comments

6. It is noted that water samples from the lysimeters were not analyzed. It is assumed these are still in place and that this analysis will occur. Vadose zone analysis would be incomplete with the data.

7. There is an inappropriate limit on the analytes discussed in this section of the report. According to Section 3.1:

> *For the purposes of this DSR Update a subset of analytes were selected for discussion. The selected analytes for soil were identified in BC (2009b) as elevated relative to background concentration and consist of the following:*
> - *Metals and metalloids: Arsenic, copper, iron, mercury, molybdenum, selenium, thallium, and uranium;*
> - *Radionuclides: Radium-226 and radium-228; and*
> - *Sulfate.*

The objective of the study referencing BC (2009b);

> "The background soils investigation was conducted to establish natural or ambient concentrations of inorganic chemicals (metals and radiochemicals)"

was limited to testing offsite material to determine ambient (background) conditions for those specific soil types. There is a reference regarding how well these matched but it

General Comments (continued)

does lack explanation; was this a match to the soil type or was there some uncertainty associated with the soil type. It is notable that the sediments are highly processed and likely do not match background soil types in leachability or other important characteristics.

This limits the discussion to direct exposure only. The subject of leachability is not part of the comparison and subsequent limits on data analysis should not be limited by concentration compared to what may be a completely different soil environment.

In summary, the comparison with background is applicable to direct exposure. It answers the question of increased exposure to workers, intruders, residents et cetera compared to similar, background, surface soils. It does not address issues of mobility and water quality. If the material is altered by the mining process to increase leachability and subsequent increases concentrations in surface or groundwater, then there is an impact even if additional amounts of the parameter in questions were not added. This section is also not consistent with the discussion in Section 3.3 that does reference MWMP data.

8. Section 3.4 makes the assumption that transport is only due to accumulation of precipitation in the ponds facilitating downward migration of COCs. Groundwater levels have historically been at elevations associated with sediments in the ponds with up to 5 feet of sediments potentially within the saturated zone (Figure 1 through Figure 3).

   These data indicate that even with pumping of the shallow groundwater from multiple nearby downgradient locations, groundwater has recently been in contact with pond sediment. Historic data indicates that is not an isolated event (Figure 3). Adding to this, these groundwater measurements are from lower pit lake levels. As the pit lake water levels increase, groundwater will follow increasing the incidence of evaporation pond sediments saturated by rising groundwater.

Document: Draft, Phase 1 Evaporation Ponds Characterization Data Summary Report Update, Anaconda Copper Mine Site – Yerington, Nevada, August 18, 2017

Reviewer: Yerington Paiute Tribe

General Comments (continued)

Comment 9 continued

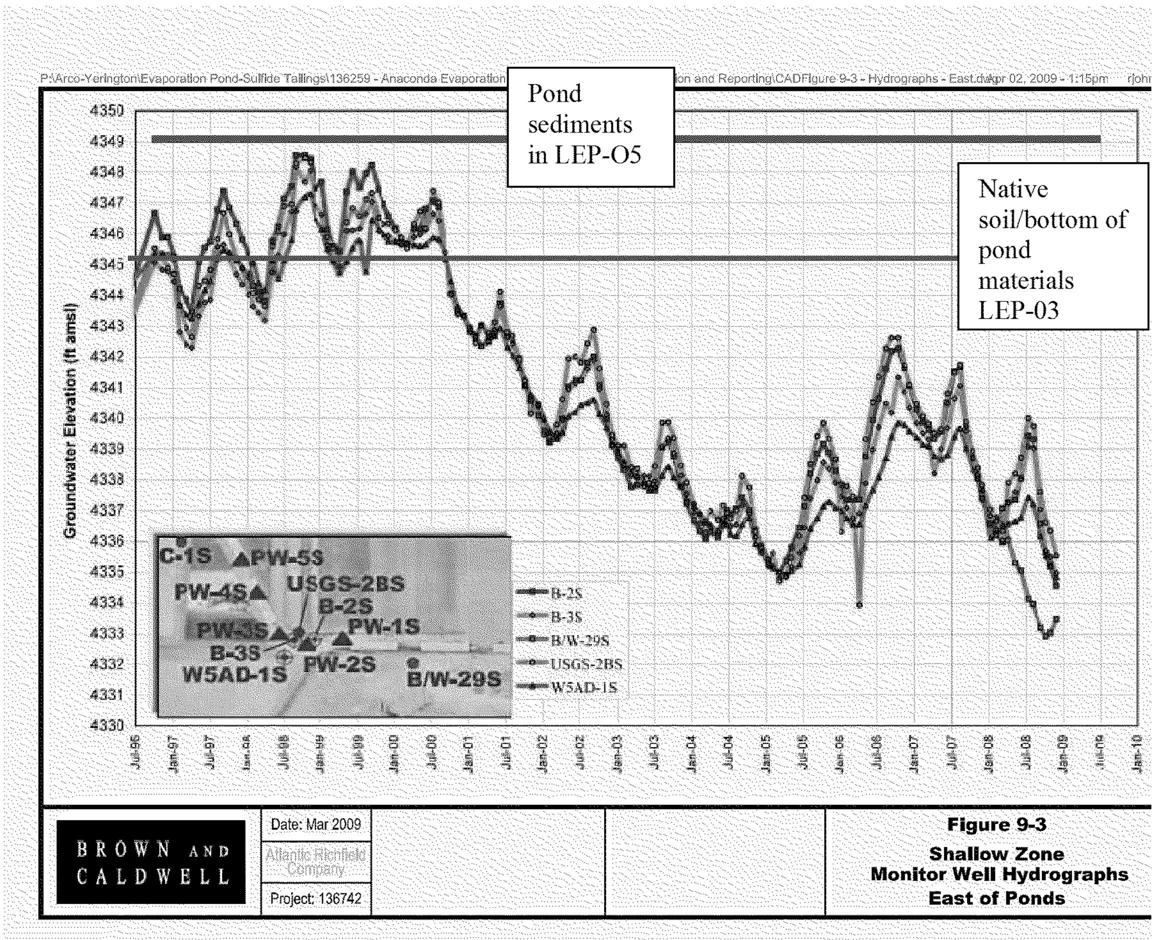


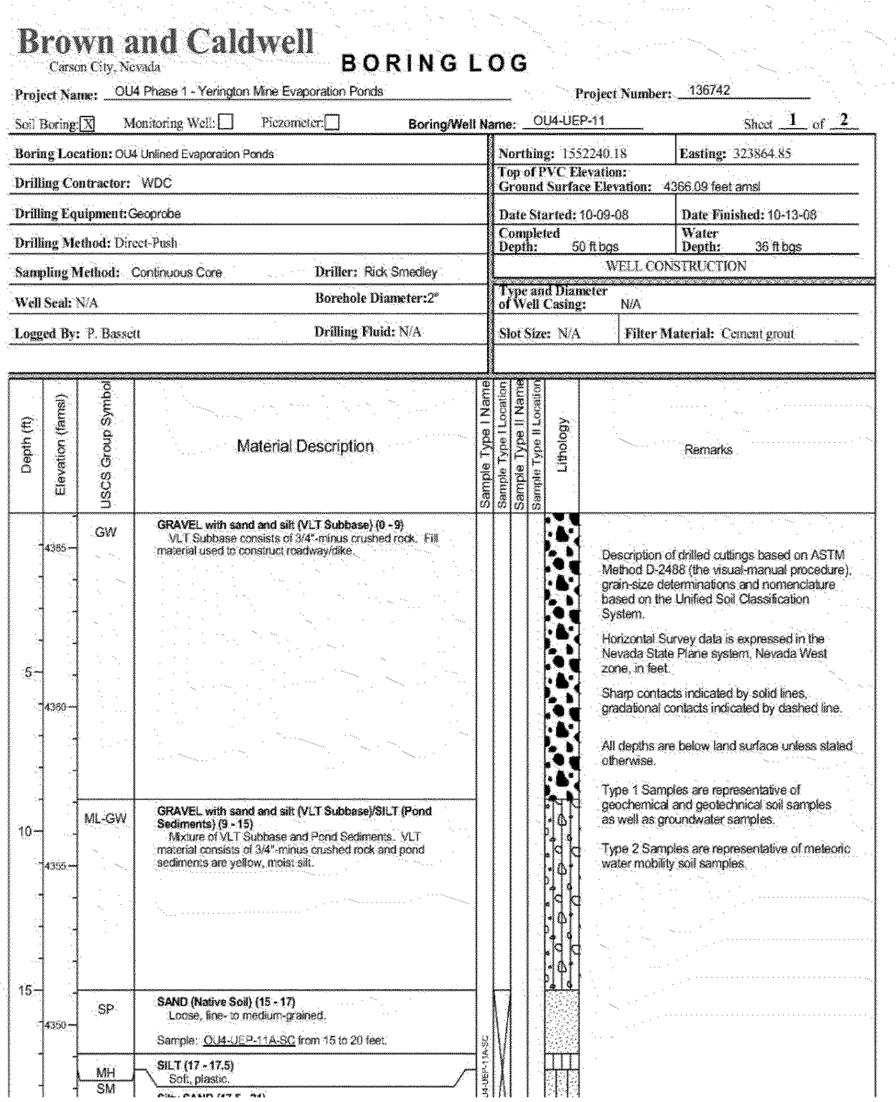
Figure 1. Elevation of pond bottom/sediments at two locations in the northern set of ponds compared to groundwater levels in nearby shallow wells. Well log presented in Figure 2.

Document: Draft, Phase 1 Evaporation Ponds Characterization Data Summary Report Update, Anaconda Copper Mine Site – Yerington, Nevada, August 18, 2017

Reviewer: Yerington Paiute Tribe

General Comments (continued)

Comment 9 continued


Brown and Caldwell
Carson City, Nevada
BORING LOG

Project Name: OU4 Phase 1 - Yerington Mine Evaporation Ponds | Project Number: 136742
Soil Boring: [X] Monitoring Well: [ ] Piezometer: [ ] | Boring/Well Name: OU4-UEP-11 | Sheet 1 of 2

Boring Location: OU4 Unlined Evaporation Ponds	Northing: 1552240.18 / Easting: 323864.85
Drilling Contractor: WDC	Top of PVC Elevation: / Ground Surface Elevation: 4366.09 feet amsl
Drilling Equipment: Geoprobe	Date Started: 10-09-08 / Date Finished: 10-13-08
Drilling Method: Direct-Push	Completed Depth: 50 ft bgs / Water Depth: 36 ft bgs
Sampling Method: Continuous Core / Driller: Rick Smedley	WELL CONSTRUCTION
Well Seal: N/A / Borehole Diameter: 2"	Type and Diameter of Well Casing: N/A
Logged By: P. Bassett / Drilling Fluid: N/A	Slot Size: N/A / Filter Material: Cement grout

Depth (ft)	Elevation (famsl)	USCS Group Symbol	Material Description	Sample Type I Name	Sample Type I Location	Sample Type II Name	Sample Type II Location	Lithology	Remarks
0–9	4365, 4360	GW	GRAVEL with sand and silt (VLT Subbase) (0 - 9) VLT Subbase consists of 3/4"-minus crushed rock. Fill material used to construct roadway/dike.						Description of drilled cuttings based on ASTM Method D-2488 (the visual-manual procedure), grain-size determinations and nomenclature based on the Unified Soil Classification System. Horizontal Survey data is expressed in the Nevada State Plane system, Nevada West zone, in feet. Sharp contacts indicated by solid lines, gradational contacts indicated by dashed line. All depths are below land surface unless stated otherwise. Type 1 Samples are representative of geochemical and geotechnical soil samples as well as groundwater samples. Type 2 Samples are representative of meteoric water mobility soil samples.
10	4355	ML-GW	GRAVEL with sand and silt (VLT Subbase)/SILT (Pond Sediments) (9 - 15) Mixture of VLT Subbase and Pond Sediments. VLT material consists of 3/4"-minus crushed rock and pond sediments are yellow, moist silt.						
15	4350	SP	SAND (Native Soil) (15 - 17) Loose, fine- to medium-grained. Sample: OU4-UEP-11A-SC from 15 to 20 feet.	OU4-UEP-11A-SC					
		MH	SILT (17 - 17.5) Soft, plastic.						
		SM	Silty SAND (17.5 - 21)						

Figure 2. Section of the boring log from UEP-11.

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Document: Draft, Phase 1 Evaporation Ponds Characterization Data Summary Report Update, Anaconda Copper Mine Site – Yerington, Nevada, August 18, 2017

Reviewer: Yerington Paiute Tribe

General Comments (continued)

Comment 9 continued

TABLE 8: GROUNDWATER LEVELS

Monitoring Well	Depth * to Water October, 1983 (Ft)	Water Level Elevation October, 1983 (Ft)	Water Level Elevation March, 1983 (Ft)	Change in Elevation (Ft)
1A	5.56	4,347.36	4,346.28	+1.08
1B	5.50	4,347.31	4,346.27	+1.04
2B	4.08	4,348.95	4,348.66	+0.29
W4CB2	5.00	4,349.73	--	--
W4CB1	4.30	4,350.19	--	--
W5AA1	3.00	4,347.54	--	--
W5AA2	3.70	4,347.42	--	--
7	6.67	4,344.95	4,345.48	-0.53
W5AB2	4.50	4,345.03	--	--
W5AB1	3.90	4,345.44	--	--
W5DB	14.10	4,349.20	--	--
W5BB	9.30	4,345.47	--	--
13	4.50	4,343.34	4,343.87	-0.53
W32DC	3.80	4,344.09	--	--

* Measuring point for depth to water is top of casing which is typically about one foot above ground level. Top of casing elevations were determined by survey in December, 1983.

Figure 3. Depth to water in wells near the evaporation ponds from *Water Quality Investigations and Mitigation Plan, Yerington Mine Site, Yerington Nevada*, Prepared for NDEP by Anaconda Minerals Company February 17, 1984.

Document: Draft, Phase 1 Evaporation Ponds Characterization Data Summary Report Update, Anaconda Copper Mine Site – Yerington, Nevada, August 18, 2017

Reviewer: Yerington Paiute Tribe

General Comments (continued)

Comment 9 continued

In addition to groundwater issues, the short term of the reported data, despite the single event of note, does not describe less intense but longer duration/series of events that can result in longer term ponding et cetera. It is likely not the event of note that the discussion in Section 3.4 and 4 associates with proposed conceptual model updates.

In summary, the report lacks critical elevation data and disregards this important issue. This results in an incomplete report that does not support the suggested conceptual model and may indicate important data gaps.